


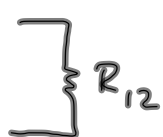


## Summary of Circuits so far...

### - Combining Resistors:

- Series  $\rightarrow$    $\Rightarrow$    
 $R_{12} = R_1 + R_2$

- Parallel  $\rightarrow$    $\Rightarrow$    
 $\frac{1}{R_{12}} = \frac{1}{R_1} + \frac{1}{R_2}$

### - Equations:

1. Ohm's Law:  $V = IR$

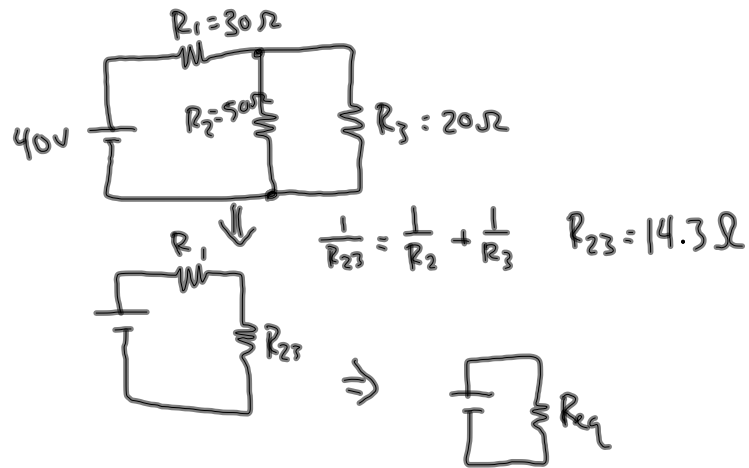
2. Power eqn.:  $P = IV = I^2 R = \frac{V^2}{R}$

3. Energy eqn.:  $E = Pt$

4. Kirchhoff's Voltage Law:  
Voltage drops = voltage gains

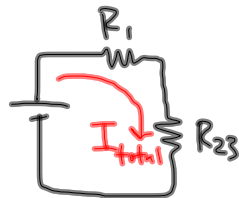
5. Kirchhoff's current law:

Current into junction = Current out  
of junction



$$V_{total} = I_{total} R_{eq}$$

$$I_{total} = \frac{40V}{44.3\Omega} = 0.903A$$



$$\begin{aligned}
 V_1 &= I_{total} R_1 \\
 &= (0.903A)(30\Omega) \\
 &= 27.1V
 \end{aligned}$$

$$I_1 = I_{total}$$



$$\begin{aligned}
 V_{23} &= I_{total} R_{23} \\
 &= (0.903A)(14.3\Omega) \\
 &= 12.9V
 \end{aligned}$$

$$\begin{aligned}
 V_{23} &= I_3 R_3 \\
 I_3 &= \frac{12.9V}{20\Omega}
 \end{aligned}$$

$$= 0.645A$$

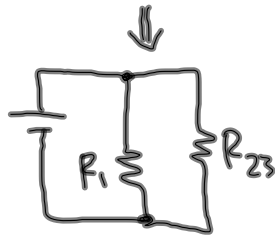
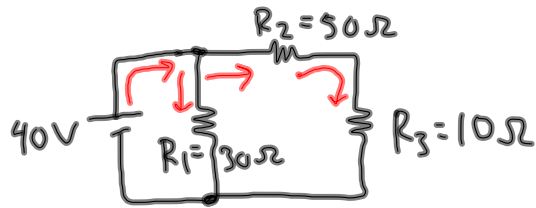
$$\begin{aligned}
 V_{23} &= I_2 R_2 \\
 I_2 &= \frac{12.9V}{50\Omega} = 0.258A
 \end{aligned}$$

$$P_{total} = I_{total} V_{total} = (0.903A)(40V) = 36.1W$$

$$P_1 = I_1 V_1$$

$$P_2 = I_2 V_2$$

$$P_3 = I_3 V_3$$



$$R_{23} = R_2 + R_3 \\ = 60 \Omega$$



$$\frac{1}{R_{eq}} = \frac{1}{R_1} + \frac{1}{R_{23}} \\ R_{eq} = 20 \Omega$$

$$V_{total} = I_{total} R_{eq}$$

$$I_{total} = \frac{40V}{20\Omega} = 2A$$

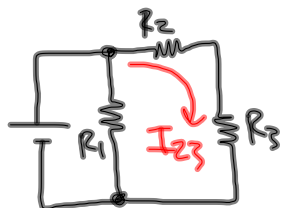


$$V_{total} = I_1 R_1$$

$$I_1 = \frac{40V}{30\Omega} = 1.33A$$

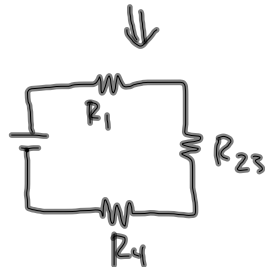
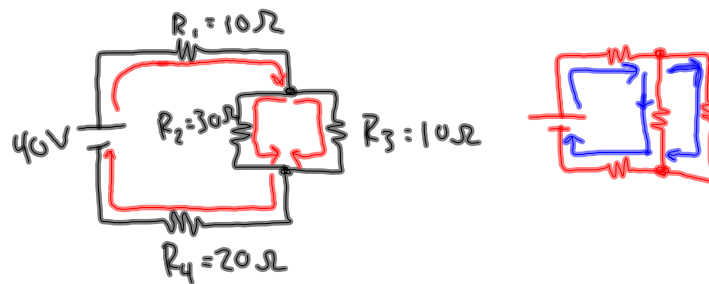
$$V_{total} = I_{23} R_{23}$$

$$I_{23} = \frac{40V}{60\Omega} = .667A$$



$$V_2 = I_{23} R_2 \\ = (.667A)(50\Omega) \\ = 33.4V$$

$$V_3 = I_{23} R_3 \\ = (.667A)(10\Omega) \\ = 6.67V$$



$$\frac{1}{R_{23}} = \frac{1}{R_2} + \frac{1}{R_3}$$

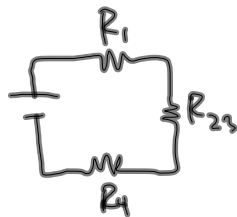
$$R_{23} = 7.5\Omega$$



$$R_{eq} = R_1 + R_{23} + R_4$$

$$= 37.5\Omega$$

$$I_{total} = \frac{V_{total}}{R_{eq}} = \frac{40V}{37.5\Omega} = 1.07A$$



$$V_1 = I_{total} R_1$$

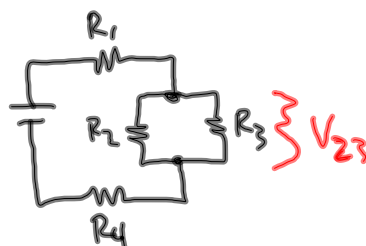
$$= 10.7V$$

$$V_{23} = I_{total} R_{23}$$

$$= 8.03V$$

$$V_4 = I_{total} R_4$$

$$= 21.4V$$



$$I_2 = \frac{V_{23}}{R_2}$$

$$= .268A$$

$$I_3 = \frac{V_{23}}{R_3}$$

$$= 0.803A$$